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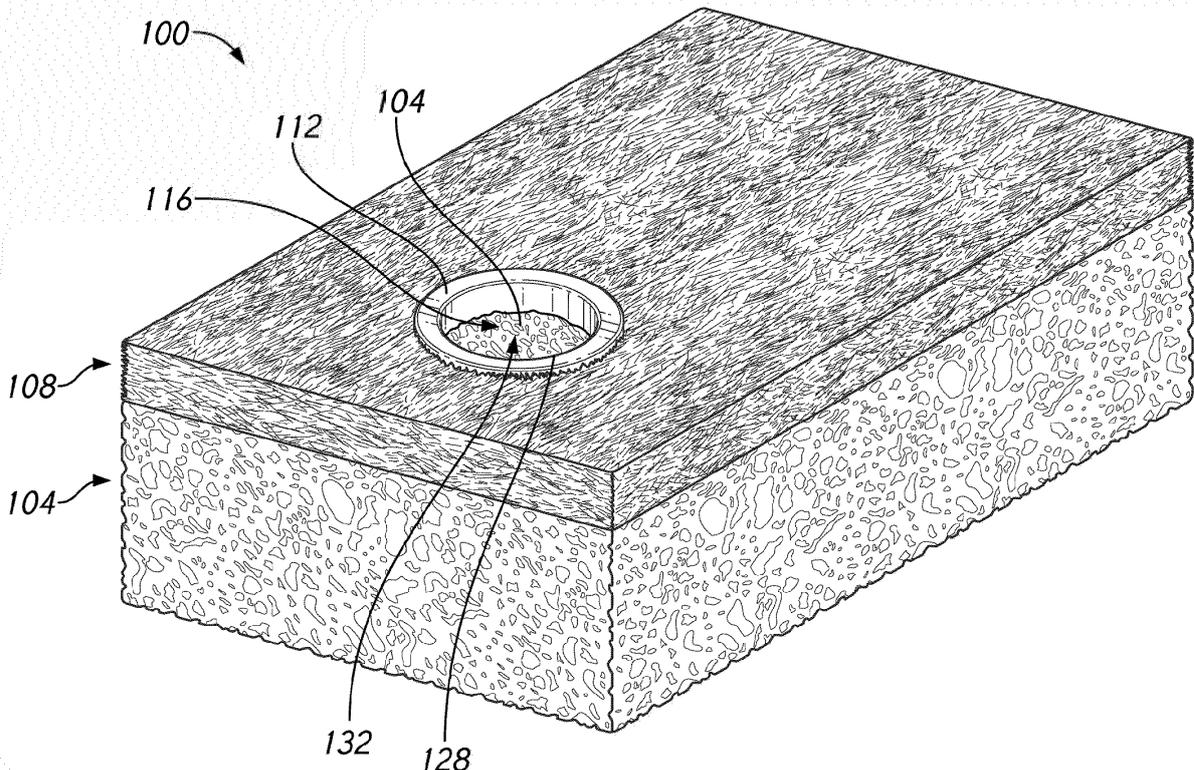
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(54) **BIOLOGICALLY-DERIVED SPONGE WITH SCRUBBING ENHANCER**

(57) A sponge is provided that can include an absorbent layer, a scrubbing layer, and a scrubbing enhancer. The absorbent layer can comprise cellulose. The scrubbing layer can be attached to a surface of the absorbent layer. The scrubbing layer can comprise a plant material

and a synthetic material. The scrubbing enhancer can be at least partially disposed within an opening of the scrubbing layer. The scrubbing enhancer can form an at least partially enclosed area. The at least partially enclosed area can be configured to receive soap.



**FIG. 1**

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**Description**

## INCORPORATION BY REFERENCE TO PRIORITY APPLICATION

**[0001]** This application claims the benefit of U.S. Provisional Application No. 63/591,905, filed October 20, 2023, and titled "BIOLOGICALLY-DERIVED SPONGE WITH SCRUBBING ENHANCER", the entire contents of which are incorporated by reference herein.

**[0002]** Any and all applications for which a foreign or domestic priority claim is identified in the Application Data Sheet as filed with the present application are hereby incorporated by reference under 37 CFR 1.57.

## BACKGROUND

Field

**[0003]** This disclosure relates generally to cleaning implements and particularly to sponges used for cleaning.

Description of the Related Art

**[0004]** Cleaning implements, such as sponges, are used to clean various surfaces and products. A user generally applies a soap, cleaning product, or liquid to a surface of the cleaning implement prior to use.

## SUMMARY

**[0005]** The following disclosure describes non-limiting examples of some embodiments. For instance, other embodiments according to the present disclosure may or may not include all of the features described herein. Moreover, disclosed advantages and benefits may apply only to certain embodiments of the invention and should not be used to limit the disclosure.

**[0006]** A cleaning implement can include any material that is effective for use in moving across or within a surface to clean it. Cleaning implements include but are not limited to sponges, towels (e.g., made of cloth or paper), rags, wipes, foam blocks, chamois, gauze, napkins, brushes, swabs, pads, coarse scouring devices (e.g., made of steel wool or plastic fibers), gloves, etc. All text or drawings in this application that refers to sponges can be applied to any cleaning implement. In some examples, eco-friendly sponges and/or biologically-derived sponges are disclosed herein. The sponges may include an absorbent layer, a scrubbing layer, and a scrubbing enhancer. The absorbent layer and/or the scrubbing layer may comprise a biologically-derived material that is readily biodegradable but also by itself or in combination with another material is sufficiently durable and tear-resistant to resist rapid disintegration or degradation during standard daily uses of cleaning sponges. For example, the absorbent layer can include or be made

entirely of cellulose or similar material, while the scrubbing layer can include or be made entirely of a fibrous plant-derived material with high stiffness and tear-resistance, such as agave or sisal. Either or both of the absorbent layer and/or the scrubbing layer can comprise one or more other materials, such as a synthetic material such as polyester. A blend of a biologically-derived material and a synthetic material can provide increased durability and/or lower cost as compared to a biologically-derived material by itself. The scrubbing enhancer may be stiffer, harder, more tear-resistant, and/or more rigid than either or both of the absorbent or scrubbing layers. For example, the scrubbing enhancer can be formed of a plastic such as polypropylene that is molded with walls that are substantially thicker than the fibers, strands, and/or connecting portions of either or both of the absorbent layer and/or the scrubbing layer. The scrubbing enhancer can be made of any other suitable material, such as a metal or a polymer such as silicone.

**[0007]** In one aspect, a sponge includes an absorbent layer, a scrubbing layer, and a plastic or silicone scrubbing enhancer. The absorbent layer comprises a cellulose. The scrubbing layer is attached to a surface of the absorbent layer. The scrubbing layer comprises a blend of sisal and polyester. In some embodiments, the scrubbing layer is at least about 55 percent or at least about 60 percent sisal. In some embodiments, the scrubbing layer is at least about 35 percent or at least about 40 percent polyester. The plastic or silicone scrubbing enhancer can be positioned within an opening within the scrubbing layer. The absorbent layer is at least partially visible through the opening of the scrubbing layer.

**[0008]** Various embodiments of one or more of the various aspects may be implemented. In some embodiments, the scrubbing enhancer is at least partially embedded within the absorbent layer. In some embodiments, the scrubbing enhancer rests on top of the absorbent layer. In some embodiments, the scrubbing enhancer is securely coupled to the absorbent layer and/or the scrubbing layer, such as with a glue, adhesive, solvent, sonic welding, heating, tying, lacing, weaving, and/or any other suitable method. In some embodiments, the scrubbing enhancer includes a flange that extends radially outwardly beyond the main body of the scrubbing enhancer. The scrubbing enhancer can be oriented so that the flange is positioned between the scrubbing layer and the absorbent layer to help secure the scrubbing enhancer in place during the pressure and back-and-forth pushing forces of normal use. In some embodiments, the scrubbing enhancer comprises polypropylene. In some embodiments, the scrubbing enhancer is generally round, generally circular, generally annular, and/or generally ring-shaped. The scrubbing enhancer can comprise one or more other shapes, such as generally polygonal, generally square, generally rectangular, generally octagonal, such that it includes one or more corners or pointed regions. In some embodiments, a top surface of the scrubbing enhancer extends beyond a top surface of

the scrubbing layer.

**[0009]** In another aspect, a sponge includes an absorbent layer, a scrubbing layer, and a scrubbing enhancer. The absorbent layer comprises a cellulose. The scrubbing layer is attached to a surface of the absorbent layer. The scrubbing layer comprises a plant material and a synthetic material. The scrubbing enhancer is at least partially disposed within an opening of the scrubbing layer. The scrubbing enhancer forms an at least partially enclosed area with an open or hollow interior. The at least partially enclosed area can be configured to receive soap.

**[0010]** Various embodiments of the various aspects may be implemented. In some embodiments, the scrubbing enhancer is at least partially embedded within the absorbent layer. In some embodiments, the scrubbing enhancer rests on top of the absorbent layer. In some embodiments, the scrubbing enhancer is glued to the absorbent layer. In some embodiments, the scrubbing enhancer is glued to the scrubbing layer. In some embodiments, the scrubbing layer is glued to the absorbent layer. In some embodiments, the scrubbing enhancer includes a flange positioned between the scrubbing layer and the absorbent layer. In some embodiments, the glue is compostable. In some embodiments, the scrubbing layer is woven to the absorbent layer. In some embodiments, the scrubbing enhancer comprises a polypropylene. In some embodiments, the scrubbing enhancer is ring shaped. In some embodiments, the plant material of the scrubbing layer is sisal and the synthetic material of the scrubbing layer is polyester. In some embodiments, the scrubbing layer is about 60 percent sisal and about 40 percent polyester.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]** Some of these drawings are schematic, showing some examples of basic parts and concepts. Many different or additional structures, implementations, components, mechanisms, steps, and processes can be used. The claimed inventions should not be limited in any way to anything illustrated in the drawings.

FIG. 1 is a perspective view of a sponge having an absorbent layer, a scrubbing layer, and a scrubbing enhancer;

FIG. 2 is a top view of the sponge of FIG. 1;

FIG. 3 is a bottom view of the sponge of FIG. 1;

FIG. 4 is a first side view of the sponge of FIG. 1;

FIG. 5 is a second side view of the sponge of FIG. 1;

FIG. 6 is an exploded view of the sponge of FIG. 1;

FIG. 7A is a perspective view of an example embodiment of a scrubbing enhancer having a flange;

FIG. 7B is a side view of the scrubbing enhancer of FIG. 7A; and

FIG. 7C is a top view of the scrubbing enhancer of FIG. 7A.

#### DETAILED DESCRIPTION

**[0012]** This specification provides textual descriptions and illustrations of many devices, components, assemblies, and subassemblies. Any structure, material, function, method, or step that is described and/or illustrated in one example can be used by itself or with or instead of any structure, material, function, method, or step that is described and/or illustrated in another example or used in this field. The text and drawings merely provide examples and should not be interpreted as limiting or exclusive. No feature disclosed in this application is considered critical or indispensable. The relative sizes and proportions of the components illustrated in the drawings form part of the supporting disclosure of this specification but should not be considered to limit any claim unless recited in such claim.

**[0013]** Various cleaning implements, including sponges, are described herein to illustrate various examples that may be employed to achieve one or more desired improvements. For example, the sponges may include an absorbent layer, a scrubbing layer, and a scrubbing enhancer. The materials of the various elements of the sponges may provide various benefits and advantages. For example, biologically-derived materials can be used to make the sponges eco-friendlier, while still being durable for use on various surfaces and messes. The term "biologically-derived" encompasses materials derived from once living things in the recent past, such as plant material, but not anciently living things, such as petroleum products. In some embodiments, the scrubbing enhancers of the sponges can provide an area of the sponge that is harder, stiffer, and/or less compliant or less compressible than either or both of the absorbent and/or scrubbing layers, without being abrasive, to assist in cleaning up difficult to clean messes without damaging the surface that is being cleaned, as well as providing an area or reservoir that can receive a soap, liquid, or other cleaning product for use. For example, in use, the area of the sponge with the scrubbing enhancer can be pushed both along in contact with a dirty surface that includes one or more unwanted substances or contaminants adhered to the dirty surface and also downward against the dirty surface. As an edge of the scrubbing enhancer contacts the one or more unwanted substances or contaminants, it resists deformation, yielding, or other reactive or responsive movement in the opposite direction of the motion of the sponge, thereby providing more force to shear, peel away, or dislodge the unwanted substances or contaminants from the dirty surface. An "enhancer" is something that improves an effect without creating significant disadvantages. A scrubbing enhancer can improve the sponge's capability of removing debris or contaminants from a surface to be cleaned beyond the scrubbing layer by itself without causing disadvantages such as scratching of the surface to be cleaned. Typical surfaces to be cleaned by the cleaning implements of this application include dishes, sinks, cutting boards, countertops, win-

dows, doors, walls, tabletops, etc. In some embodiments, the material and shape of a scrubbing enhancer can be selected such that it does not scratch or otherwise harm typical surfaces to be cleaned during normal use.

**[0014]** Figures 1-6 illustrate an example embodiment of a sponge 100 having an absorbent layer 104, a scrubbing layer 108, and a scrubbing enhancer 112. While a rectangular sponge 100 is depicted, the sponge 100 can be any shape. For example, the shape of the sponge can be generally circular, oval, square, rectangular, polygonal, etc. The absorbent layer 104 can be coupled to or attached to the scrubbing layer 108. In some embodiments, a surface of the absorbent layer 104 can be glued to a corresponding surface of the scrubbing layer 108. The glue can be eco-friendly and/or compostable. In some embodiments, an adhesive can be used to attach the absorbent layer 104 to the scrubbing layer 108. The adhesive can be eco-friendly and/or compostable. In some embodiments, the absorbent layer 104 can be woven to the scrubbing layer 108. In some embodiment, the absorbent layer 104 can be stitched to the scrubbing layer 108. In some embodiments, a combination of glue, adhesive, stitching and/or weaving can be used to attach the absorbent layer 104 and the scrubbing layer 108.

**[0015]** The absorbent layer 104 can have a thickness T1 that is larger than a thickness T2 of the scrubbing layer 108, for example, as shown in FIGS. 4 and 5. In some embodiments, the thickness T1 of the absorbent layer 104 can make up at least about 50 percent of the overall thickness of the sponge 100. For example, the thickness T1 of the absorbent layer 104 can be at least about 50 percent, at least about 60 percent, and/or at least about 80 percent. In some embodiments, the thickness T1 of the absorbent layer 104 can be approximately equal to the thickness T2 of the scrubbing layer 108. In some embodiments, the thickness T1 of the absorbent layer 104 can be less than the thickness T2 of the scrubbing layer 108.

**[0016]** The absorbent layer 104 can comprise a biologically-derived and/or eco-friendly material. The absorbent layer 104 can be porous. In some embodiments, the absorbent layer 104 can comprise a wood and/or plant pulp. For example, the absorbent layer 105 can comprise walnut fibers from a walnut tree and/or walnut shell. The absorbent layer 104 can comprise cellulose. The use of a wood and/or plant pulp and/or cellulose can be beneficial as the materials can be easy to mold or shape into the desired shape for the sponge. In some embodiments, the absorbent layer 104 can be a sea sponge material or a synthetic material.

**[0017]** The scrubbing layer 108 can comprise one or more biologically-derived and/or eco-friendly materials. In some embodiments, the scrubbing layer 108 can be a blend and/or mix of a plant material and a synthetic material. In some embodiments, the plant material can comprise a highly fibrous material, such as a material from a monocotyledon or other flowering grass plant. Some examples of monocotyledons that produce biolo-

gically-derived materials include agave (e.g., sisal), yucca, and/or palm, etc. In some embodiments, the synthetic material can be a polymer. For example, polyethylene or polyester can be used. When forming the scrubbing layer 108, the synthetic material can function as a substrate on which the plant material is bonded. Additionally, the synthetic material can provide an increase in durability as compared with the scrubbing layer 108.

**[0018]** The plant material of the scrubbing layer 108 can comprise at least about 50 percent of the blend of plant material and synthetic material. For example, the plant material can be at least about 50 percent, at least about 60 percent, at least about 70 percent, at least about 80 percent, and/or at least about 90 percent of the blend of plant material and synthetic material. In some embodiments, the percentage of plant material can be approximately equal to or less than the synthetic material.

**[0019]** The synthetic material of the scrubbing layer 108 can comprise less than or equal to about 50 percent of the blend of plant material and synthetic material. For example, the synthetic material can be less than or equal to about 50 percent, less than or equal to about 40 percent, less than or equal to about 30 percent, less than or equal to about 20 percent, or less than or equal to about 10 percent of the blend of plant material and synthetic material. In some embodiments, the percentage of synthetic material can be equal to or more than the synthetic material.

**[0020]** The scrubbing layer 108 can include an opening 116, for example as shown in FIG. 6. The opening can extend completely through the scrubbing layer 108 (e.g., a bore) or the opening can extend partially into the scrubbing layer 108 (e.g., a recess). In some embodiments, the scrubbing layer 108 can include more than one opening 116. For example, two, three, four or more openings 116. The opening 116 can extend from a top surface 120 to a bottom surface 124 of the scrubbing layer 108. The opening 116 can have a height that is approximately equal to or at least about as large as the thickness T2 of the scrubbing layer 108. The opening 116 can be sized such that a portion of the absorbent layer 104 is visible when the scrubbing enhancer 112 is positioned at least partially within the opening 116 according to the present disclosure. The perimeter of the opening 116 can correspond in shape and/or size to an outer perimeter of the scrubbing enhancer 112. For example, the opening 116 can be any shape, non-limiting examples include generally circular, oval, square, rectangular, polygonal, etc. The scrubbing enhancer 112 can correspond in shape to the opening 116. In some embodiments, the outer perimeter of the scrubbing enhancer 112 can contact at least a portion of the perimeter of the opening 116. The outer perimeter of the scrubbing enhancer 112 can fit tightly or snugly within the perimeter of the opening 116, without any visible or significant gaps or spaces, to prevent an appreciable amount of debris or contaminants from accumulating between these respective perimeters during use.

**[0021]** In some embodiments, the opening 116 can have a diameter or cross-sectional width of at least about 14 mm, at least about 16 mm, at least about 18 mm, at least about 20 mm, at least about 22 mm, at least about 24 mm, or at least about 26 mm. The scrubbing enhancer 112 can have a diameter that generally corresponds to that of the opening 116, for example a diameter of at least about 14 mm, at least about 16 mm, at least about 18 mm, at least about 20 mm, at least about 22 mm, at least about 24 mm, or at least about 26 mm. The diameters of the opening 116 and the scrubbing enhancer 112 can be about equal such that the wall of the opening 116 contacts the outer perimeter of the scrubbing enhancer 112. In some embodiments, the depth of the opening 116 can be at least about 3 mm, at least about 4 mm, at least about 5 mm, or at least about 6 mm.

**[0022]** The opening 116 can be positioned in any suitable location in the scrubbing layer 108. In some embodiments, the opening 116 can be positioned generally central relative to the width  $W$  of the sponge 100. In some embodiments, the opening 116 can be positioned off center relative to the width  $W$  of the sponge 100. In some embodiments, the opening 116 can be positioned off center relative to the length  $L$  of the sponge 100. In some embodiments, the opening 116 can be positioned generally central relative to the length  $L$  of the sponge 100. In some embodiments, the opening 116 can be positioned closer to one or more edges 118 of the sponge 100 than the center of the sponge 100. In embodiments, having more than one opening 116, the openings 116 can be uniformly spaced about the sponge 100. In some embodiments, as shown, the scrubbing enhancer 112 can be conveniently located so that when a user is gripping the sponge 100 during scrubbing, with the absorbent layer 104 facing up and the scrubbing layer 108 facing down (e.g., for positioning against the surface to be cleaned), the scrubbing enhancer 112 is located on the opposite side of the sponge 100 directly below the end of the user's index finger. The user can push down with the index finger through the sponge 100 to apply a downward force against the scrubbing enhancer 112. This downward force can increase the friction between the scrubbing enhancer 112 and the surface to be cleaned, thereby increasing the capability of the scrubbing enhancer 112 to remove unwanted substances from the surface to be cleaned as the sponge 100 is advanced back and forth along the surface to be cleaned.

**[0023]** The scrubbing enhancer 112 can be at least partially disposed within the scrubbing layer 108, as shown in FIGS. 1 and 2. The scrubbing enhancer 112 can be positioned at least partially within the opening 116. In some embodiments, the scrubbing enhancer 112 can rest on top of the absorbent layer 104 when positioned within the opening 116. In some embodiments, the scrubbing enhancer 112 can be partially embedded within of the absorbent layer 104. For example, the scrubbing enhancer 112 can be embedded within a recess of the absorbent layer 104. To secure the scrubbing enhancer

112 to the sponge 100, the scrubbing enhancer 112 can be glued and/or adhered to at least a portion of the top surface of the absorbent layer 104 that is exposed through the opening 116 and/or glued and/or adhered to at least a portion of the scrubbing layer 108 that defines the opening 116. For example, an outer perimeter of the scrubbing enhancer 112 can be glued to the portion of the scrubbing layer 108 that the outer perimeter comes in contact with. In some embodiments, the size of the opening 116 can be sized relative to the size of the scrubbing enhancer 112 such that the scrubbing enhancer 112 is retained within the opening 116 without the use of glue or other method of securement. For example, a force applied to the scrubbing enhancer 112 be the perimeter of the opening 116 can retain the scrubbing enhancer 112. In some embodiments, the scrubbing enhancer 112 can be stitched or woven to the scrubbing layer 108 and/or the absorbent layer 104.

**[0024]** In some embodiments, the scrubbing enhancer 112 can include a flange 117, for example as shown in FIGS. 7A-C. The flange 117 can extend around an outer perimeter of the scrubbing enhancer 112. The flange 117 can extend from a bottom surface 119 of the scrubbing enhancer 112. The flange 117 can assist in more securely attaching the scrubbing enhancer 112 to the sponge 100. The scrubbing enhancer 112 can be oriented within the cleaning implement so that the flange 117 can be positioned between the absorbent layer 104 and the scrubbing layer 108. The flange 117 can have a diameter  $D1$  that exceeds a diameter of the opening 116 such that the flange 117 is at least partially covered by the absorbent layer 104 and the scrubbing layer 108. In some embodiments, the flange 117 can be a partial flange or comprise more than one portion. For example, the flange 117 may not extend around the entire outer perimeter of the scrubbing enhancer 112.

**[0025]** In some embodiments, the scrubbing enhancer 112 can have a height that is approximately equal to or greater than a height of the opening 116 (e.g., the thickness  $T2$  of the scrubbing layer 108). In embodiments where the scrubbing enhancer 112 has a height that is approximately equal to the height of the opening 116, a top surface of the scrubbing enhancer 112 can be generally flush with the top surface of the scrubbing layer 108. In embodiments where the scrubbing enhancer has a height that is greater than the height of the opening 116, the top surface of the scrubbing enhancer 112 can extend beyond the top surface of the scrubbing layer 108. Alternatively, in embodiments where the height of the scrubbing enhancer 112 exceeds the height of the opening 116, a portion of the scrubbing enhancer 112 can be embedded in the absorbent layer 104 and the top surface of the scrubbing enhancer 112 can be generally flush with the top surface of the scrubbing layer 108 or the top surface of the scrubbing enhancer 112 can extend beyond the top surface of the scrubbing layer 108. It can be beneficial to have a portion of the scrubbing enhancer 112 extend above the top surface of the scrubbing layer

108 as it can allow the scrubbing enhancer 112 to better contact dirty surfaces during use.

**[0026]** The scrubbing enhancer 112 can have an inner perimeter 128. The inner perimeter 128 can generally surround an open area 132. In some embodiments, the inner perimeter 128 can have a tapered portion 129 and a cylindrical portion 130, as shown in FIG. 7A. The cylindrical portion 130 can extend upward from the flange 117. The cylindrical portion 130 can then transition to the tapered portion 129. The tapered portion 129 can extend outward from the transition to a top surface of the scrubbing enhancer 112. For example, the diameter of the open area 132 can increase from the transition to the top surface of the scrubbing enhancer. The diameter of the open area 132 within the cylindrical portion 130 can be generally constant. The open area 132 can be smaller than the opening 116 of the scrubbing layer 108. The open area 132 can be within the opening 116. The open area 132 can expose a portion of the absorbent layer 104 that is visible through the opening 116 of the scrubbing layer 108. In some embodiments, the open area 132 can have a portion of the scrubbing layer 108 positioned within it such that the absorbent layer 104 is not visible through the open area 132. For example, the scrubbing enhancer 112 can rest on or be embedded in the absorbent layer 104 while the scrubbing layer 108 is positioned both outside and inside the open area 132. In some embodiments, the scrubbing layer 108 can have a recess instead of the opening 116 such that the scrubbing enhancer 112 rests within the recess on top of a portion of the scrubbing layer 108.

**[0027]** The open area 132 can include a receiving area or reservoir that is configured to receive a useful liquid (e.g., cleaning or sanitizing product) during use. Non-limiting examples include soap, water, bleach, sanitizer (e.g., alcohol-infused gel), soap variants, etc. For example, during use soap can be deposited at least partially within the open area 132. The soap can then be at least partially absorbed into the absorbent layer 104. The soap (or other product deposited within the open area 132) in combination with the scrubbing enhancer 112 can work together to clean a surface. The reservoir can have a volume sufficiently large to be capable of receiving a useful liquid in a quantity that can help accomplish an expected task or series of tasks. For example, in some embodiments, the volume can be sufficient for supplying enough soap to wash one person's set of dishes after a meal. In some embodiments, the volume of the reservoir can be at least about 0.4 mL, or at least about 1.0 mL, or at least about 2 mL, or at least about 4 mL.

**[0028]** The scrubbing enhancer 112 can comprise a material that has a hardness that is greater than a hardness of one or more or all other components of the sponge 100. The hardness can be sufficiently high that it assists in cleaning a surface, while also sufficiently low so as to limit the abrasive nature of the scrubbing enhancer to prevent or resist any damage to the surface to be cleaned. The scrubbing enhancer 112 can comprise a

plastic or silicone material. In some embodiments, the scrubbing enhancer 112 can be a polymer. For example, the scrubbing enhancer 112 can comprise polypropylene. The scrubbing enhancer 112 can be configured such that it can assist in removing food particles, dirt, grease, oil, etc. from surfaces. The scrubbing enhancer 112 can act as a scrubber. As illustrated, in some embodiments, a diameter or cross-sectional width of the outermost or top portion of the scrubbing enhancer 112 can be larger than the diameter or cross-sectional width of the bottom or embedded or other portion of the scrubbing enhancer 112, creating a thin lip or edge on the scrubbing enhancer 112 in the direction of motion of the sponge 100 during scrubbing. As shown, the outer perimeter of the scrubbing enhancer 112 can be generally smooth and/or generally continuous. A supplier of any of the embodiments of sponges 100 disclosed and/or illustrated in this specification can provide instructions for using the sponges 100. For example, the supplier can demonstrate or instruct a user to deposit, insert, or fill the opening 116 with a useful liquid such as soap in any useful amount including those disclosed anywhere herein, dampening the sponge 100 with water, using either or both layers of the sponge 100 to scrub or clean a surface, and/or performing any other function or capability described and/or illustrated anywhere in this specification.

**[0029]** Conditional language, such as "can," "could," "might," or "may," unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements, and/or steps. Thus, such conditional language is not generally intended to imply that features, elements, and/or steps are in any way required for one or more embodiments.

**[0030]** The terms "comprising," "including," "having," and the like are synonymous and are used inclusively, in an open-ended fashion, and do not exclude additional elements, features, acts, operations, and so forth. Also, the term "or" is used in its inclusive sense (and not in its exclusive sense) so that when used, for example, to connect a list of elements, the term "or" means one, some, or all of the elements in the list.

**[0031]** The terms "about" and "substantially" as used herein represent an amount close to the stated amount that still performs a desired function or achieves a desired result. For example, in some but not all embodiments, as the context may permit, the terms "about" and "substantially" may refer to an amount that is within 10% of the stated amount.

**[0032]** The term "generally" as used herein represents a value, amount, or characteristic that predominantly includes or tends toward a particular value, amount, or characteristic. As an example, in certain embodiments, as the context may permit, the term "generally perpendicular" can refer to something that departs from exactly perpendicular by less than or equal to 20 degrees.

**[0033]** The ranges disclosed herein also encompass

any and all overlap, sub-ranges, and combinations thereof. Language such as "up to," "at least," "greater than," "less than," "between" and the like includes the number recited. Numbers preceded by a term such as "about" or "approximately" include the recited numbers. For example, "about 5 mm" includes "5 mm."

**[0034]** For expository purposes, the term "horizontal" as used herein is defined as a plane parallel to the plane or surface of the area in which the sponges being described is used or the method being described is performed, regardless of its orientation. The term "vertical" refers to a direction perpendicular to the horizontal as just defined. Terms such as "above," "below," "bottom," "top," "side," "higher," "lower," "upper," "over," and "under," are defined with respect to the horizontal plane.

**[0035]** Although certain embodiments and examples have been described herein, it will be understood by those skilled in the art that many aspects of the sponges shown and described in the present disclosure may be differently combined and/or modified to form still further embodiments or acceptable examples. All such modifications and variations are intended to be included herein within the scope of this disclosure. A wide variety of designs and approaches are contemplated. No feature, structure, or step disclosed herein is essential or indispensable.

**[0036]** For purposes of this disclosure, certain aspects, advantages, and novel features are described herein. It is to be understood that not necessarily all such advantages may be achieved in accordance with any particular embodiment. Thus, for example, those skilled in the art will recognize that the disclosure may be embodied or carried out in a manner that achieves one advantage or a group of advantages as taught herein without necessarily achieving other advantages as may be taught or suggested herein.

**[0037]** Moreover, while illustrative embodiments have been described herein, the scope of any and all embodiments having equivalent elements, modifications, omissions, combinations (e.g., of aspects across various embodiments), adaptations and/or alterations as would be appreciated by those in the art based on the present disclosure. The limitations in the claims are to be interpreted broadly based on the language employed in the claims and not limited to the examples described in the present specification or during the prosecution of the application, which examples are to be construed as non-exclusive. Further, the actions of the disclosed processes and methods may be modified in any manner, including by reordering actions and/or inserting additional actions and/or deleting actions. It is intended, therefore, that the specification and examples be considered as illustrative only, with a true scope and spirit being indicated by the claims and their full scope of equivalents.

**[0038]** The invention can be arranged as follows:

1. A sponge comprising:

an absorbent layer comprising a cellulose;  
a scrubbing layer attached to a surface of the absorbent layer, the scrubbing layer comprising a blend of sisal and polyester; and  
a plastic or silicone scrubbing enhancer comprising an opening within the scrubbing layer, wherein the absorbent layer is at least partially visible through the opening of the scrubbing layer.

2. The sponge of Clause 1, wherein the scrubbing enhancer is at least partially embedded within the absorbent layer.
3. The sponge of Clause 1, wherein the scrubbing enhancer rests on top of the absorbent layer.
4. The sponge of Clause 1, wherein the scrubbing enhancer is glued to the absorbent layer.
5. The sponge of Clause 1, wherein the scrubbing enhancer is glued to the scrubbing layer.
6. The sponge of Clause 1, wherein the scrubbing enhancer further comprises a flange configured to be positioned between the scrubbing layer and the absorbent layer.
7. The sponge of Clause 1, wherein the scrubbing layer is glued to the absorbent layer.
8. The sponge of Clause 7, wherein the glue is compostable.
9. The sponge of Clause 1, wherein the scrubbing layer is woven to the absorbent layer.
10. The sponge of Clause 1, wherein the scrubbing enhancer comprises polypropylene.
11. The sponge of Clause 1, wherein the scrubbing enhancer is ring shaped.
12. The sponge of Clause 1, wherein a top surface of the scrubbing enhancer extends beyond a top surface of the scrubbing layer.

## Claims

1. A sponge comprising:

an absorbent layer comprising a cellulose;  
a scrubbing layer attached to a surface of the absorbent layer, the scrubbing layer comprising a plant material and a synthetic material; and  
a scrubbing enhancer at least partially disposed within an opening of the scrubbing layer, the scrubbing enhancer forming an at least partially enclosed area, the at least partially enclosed area configured to receive soap.

2. The sponge of Claim 13, wherein the scrubbing enhancer is at least partially embedded within the absorbent layer.
3. The sponge of Claim 1, wherein the scrubbing enhancer rests on top of the absorbent layer.

4. The sponge of Claim 1, wherein the scrubbing enhancer is glued to the absorbent layer.
5. The sponge of Claim 1, wherein the scrubbing enhancer is glued to the scrubbing layer. 5
6. The sponge of Claim 1, wherein the scrubbing enhancer further comprises a flange configured to be positioned between the scrubbing layer and the absorbent layer. 10
7. The sponge of Claim 1, wherein the scrubbing layer is glued to the absorbent layer.
8. The sponge of Claim 7, wherein the glue is composable. 15
9. The sponge of Claim 1, wherein the scrubbing layer is woven to the absorbent layer. 20
10. The sponge of Claim 1, wherein the scrubbing enhancer comprises polypropylene.
11. The sponge of Claim 1, wherein the scrubbing enhancer is ring shaped. 25
12. The sponge of Claim 1, wherein the plant material of the scrubbing layer is sisal and the synthetic material of the scrubbing layer is polyester. 30
13. The sponge of Claim 12, wherein the scrubbing layer is about 60 percent sisal and about 40 percent polyester.
14. The sponge of Claim 1, wherein the scrubbing enhancer is a plastic or silicone. 35

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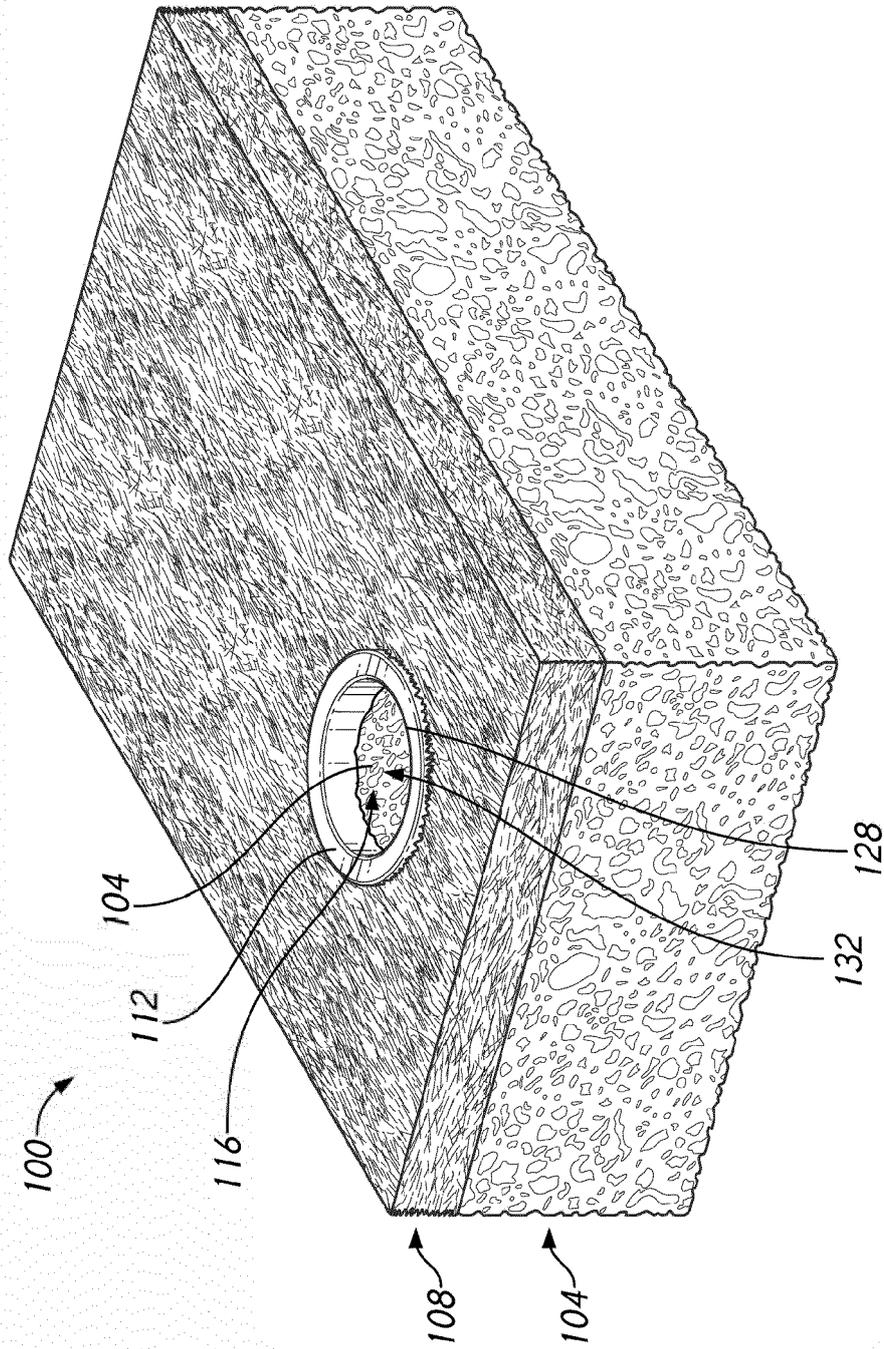


FIG. 1

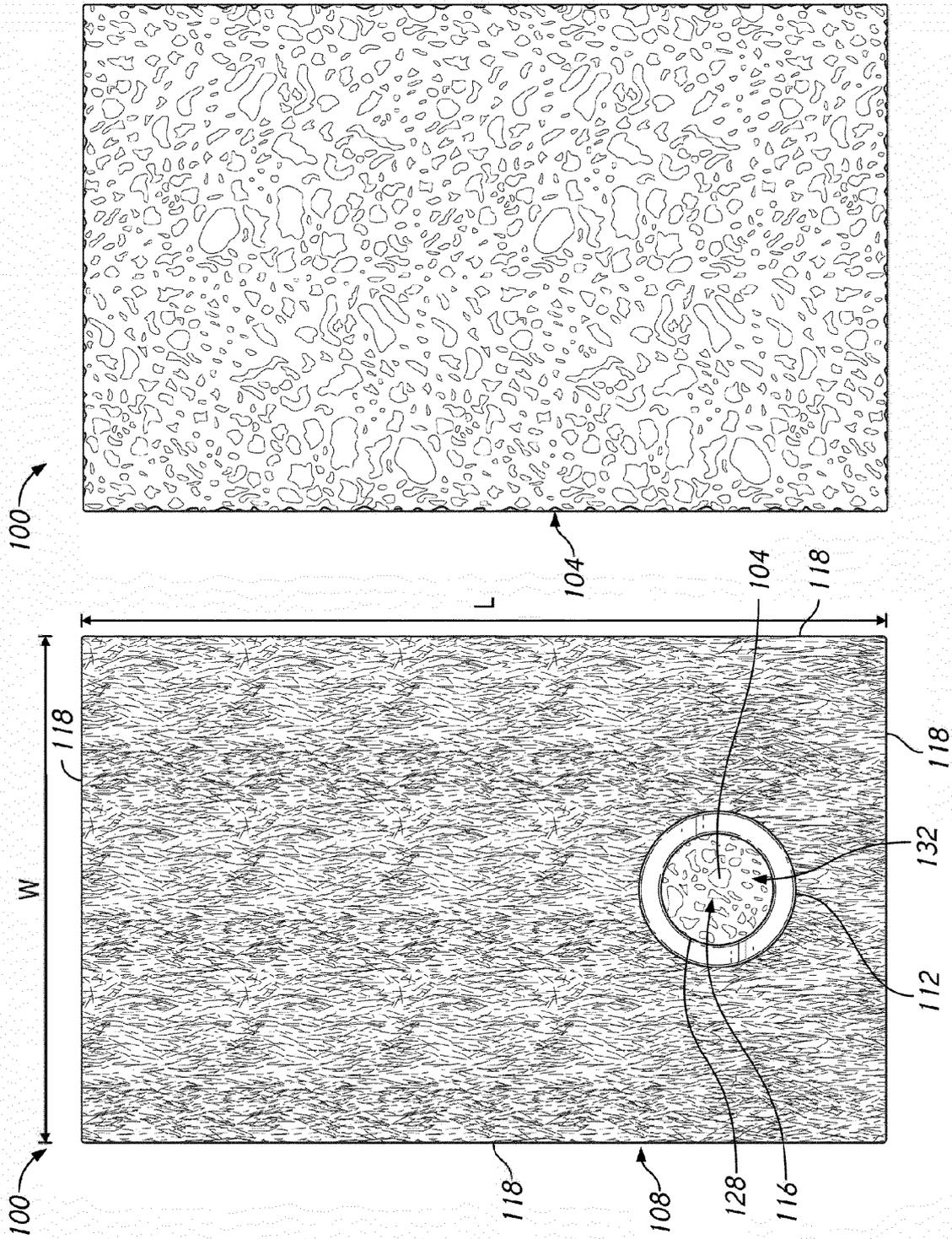


FIG. 3

FIG. 2

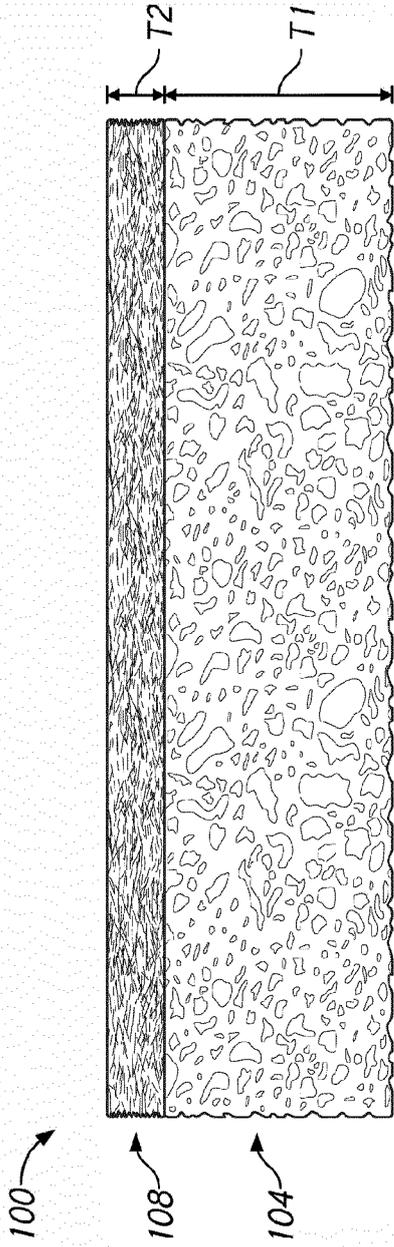


FIG. 4

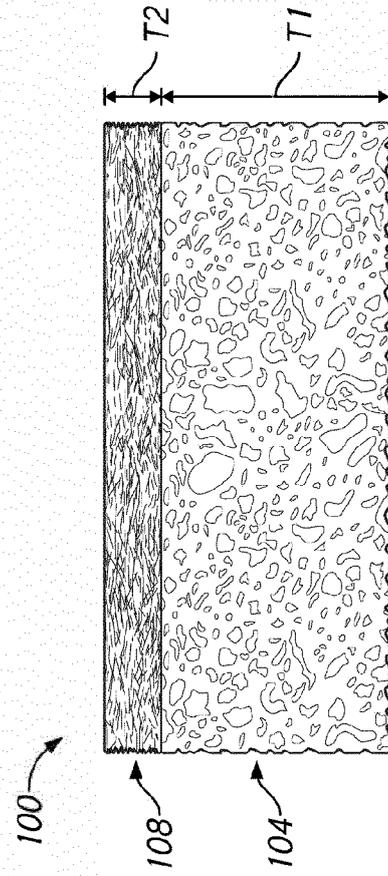


FIG. 5

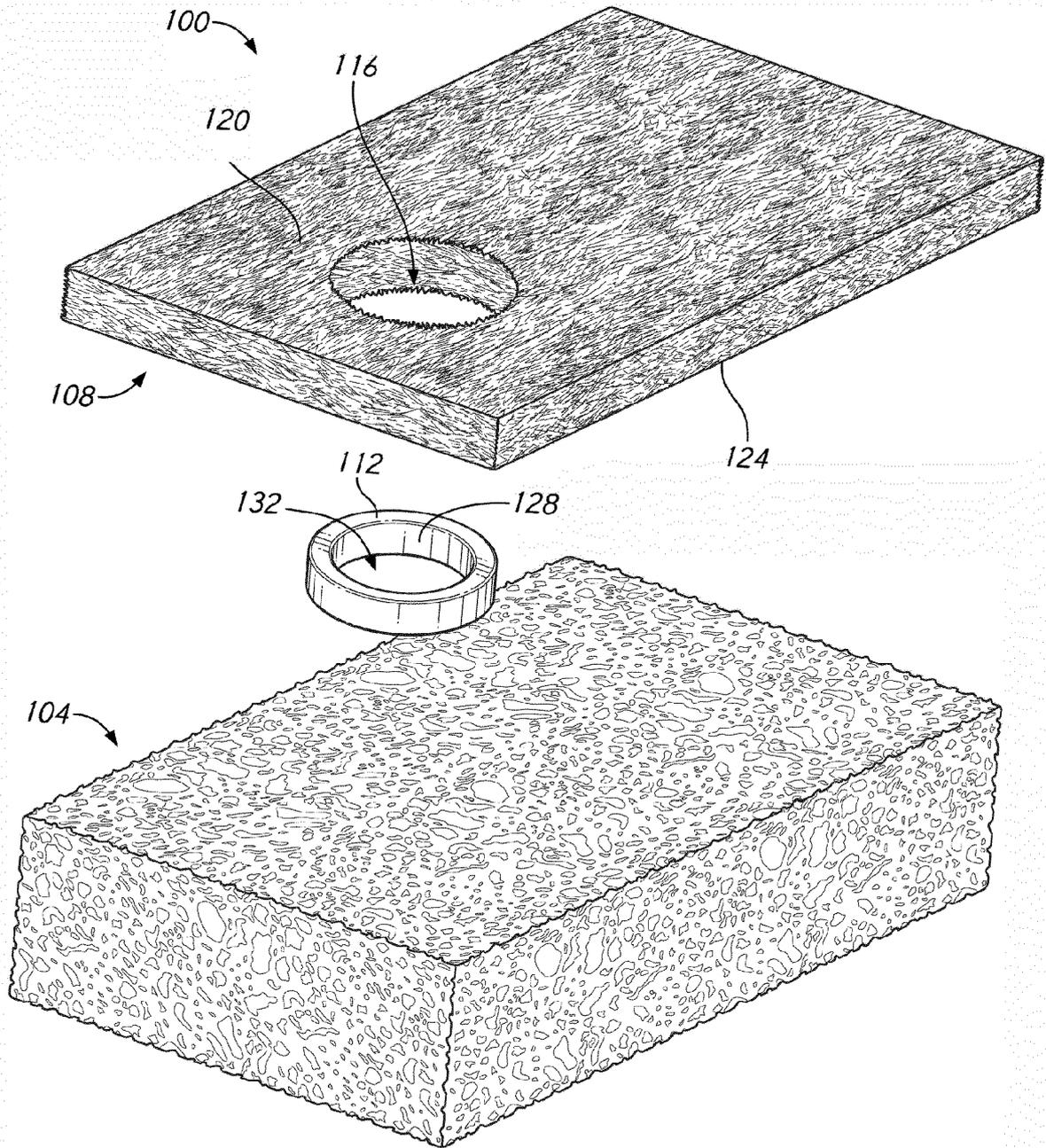
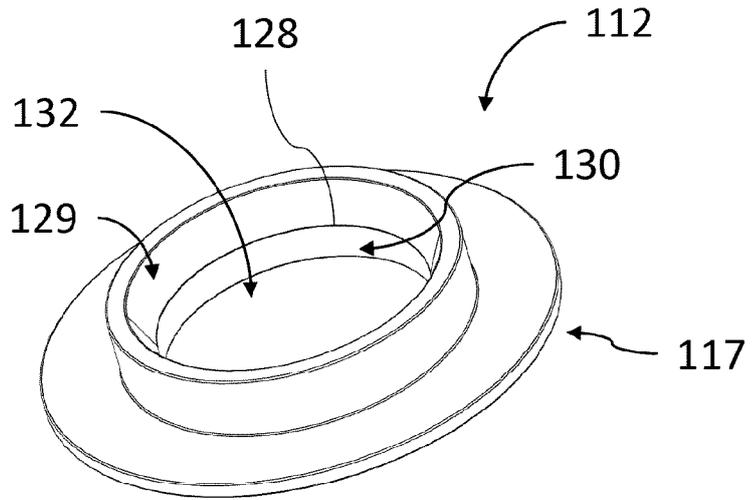
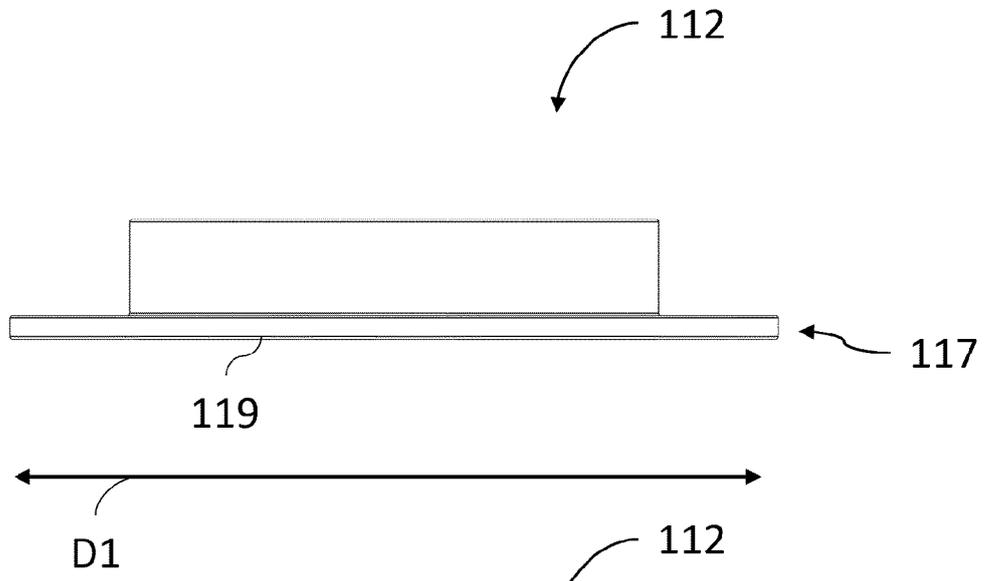


FIG. 6

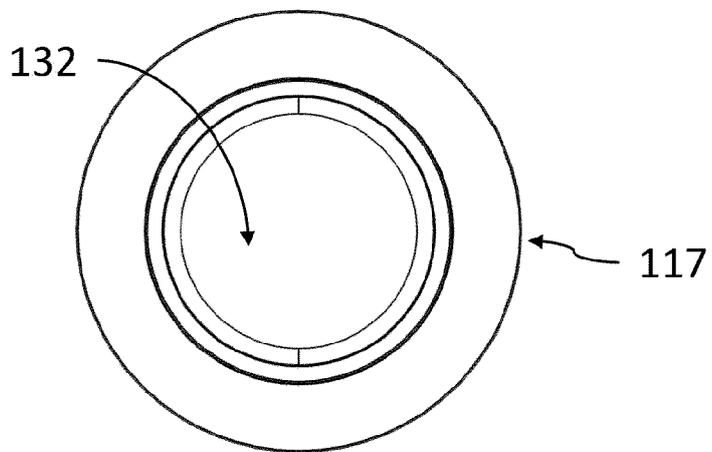
**FIG. 7A**



**FIG. 7B**



**FIG. 7C**





EUROPEAN SEARCH REPORT

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EP 24 20 7183

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